

PATENT

Attorney Docket No.: AMAT/7985/CMP/CMP/RKK
Express Mail No.: EV335471122US

What is Claimed is:

1. A method for processing a substrate, comprising:
providing a substrate comprising a first dielectric material disposed on a second dielectric material;
polishing the substrate with a first polishing composition and a abrasive-free polishing article until bulk first dielectric material is substantially removed; and
polishing the substrate with a second polishing composition and a fixed-abrasive polishing article to remove residual first dielectric material formed thereon.
2. The method of claim 1, wherein the first polishing composition comprises an abrasive-containing polishing composition.
3. The method of claim 2, wherein the first polishing composition has a removal rate ratio of first dielectric material to second dielectric material of between about 1:1 and about 5:1.
4. The method of claim 1, wherein the second polishing composition has a removal rate ratio of first dielectric material to second dielectric material of about 30:1 or greater.
5. The method of claim 1, wherein the fixed-abrasive polishing article comprises a high removal rate fixed-abrasive web material.
6. The method of claim 1, wherein the second polishing composition further contains abrasive particles.
7. The method of claim 1, further comprising altering the surface of the fixed-abrasive polishing article with a non-mechanical technique selected from the group of applying heat to the polishing article, chemical etching the polishing article, or combinations thereof.

PATENT

Attorney Docket No.: AMAT/7985/CMP/CMP/RKK
Express Mail No.: EV335471122US

8. A method for processing a substrate, comprising:

providing a substrate comprising a first dielectric material disposed on a second dielectric material, wherein the surface of the first dielectric material has a non-planar topography;

polishing the substrate with a first polishing composition and a first fixed-abrasive polishing article to remove at least the topography of the first dielectric material;

polishing the substrate with a second polishing composition and a abrasive-free polishing article until bulk first dielectric material is substantially removed; and

polishing the substrate with a third polishing composition and a second fixed-abrasive polishing article to remove residual first dielectric material formed thereon.

9. The method of claim 8, wherein the second polishing composition comprises an abrasive-containing polishing composition.

10. The method of claim 9, wherein the second polishing composition has a removal rate ratio of first dielectric material to second dielectric material of between about 1:1 and about 5:1.

11. The method of claim 8, wherein the first and third polishing compositions have a removal rate ratio of first dielectric material to second dielectric material of about 30:1 or greater.

12. The method of claim 8, wherein the first fixed-abrasive polishing article comprises a hard resin fixed-abrasive web material.

13. The method of claim 8, wherein the second fixed-abrasive polishing article comprises a high removal rate fixed-abrasive web material.

14. The method of claim 8, wherein the first and third polishing compositions further contain abrasive particles.

PATENT

Attorney Docket No.: AMAT/7985/CMP/CMP/RKK
Express Mail No.: EV335471122US

15. The method of claim 8, further comprising altering the surface of the first or second fixed-abrasive polishing articles with a non-mechanical technique selected from the group of applying heat to the polishing article, chemical etching the polishing article, or combinations thereof.

16. A method for processing a substrate, comprising:

providing a substrate comprising a first dielectric material disposed on a second dielectric material, wherein the surface of the first dielectric material has a non-planar topography;

polishing the substrate with a first polishing composition and a first fixed-abrasive polishing article to remove at least the topography of the first dielectric material;

polishing the substrate with a second polishing composition and a second fixed-abrasive polishing article until bulk first dielectric material is substantially removed; and

polishing the substrate with a third polishing composition and a third fixed-abrasive polishing article to remove residual first dielectric material formed thereon.

17. The method of claim 16, wherein the first fixed-abrasive polishing article has a first removal rate of the first dielectric material.

18. The method of claim 17, wherein the second fixed-abrasive polishing article has a second removal rate greater than the first removal rate of the first dielectric material, and the third fixed-abrasive polishing article has a third removal rate greater than the first removal rate of the first dielectric material.

19. The method of claim 16, wherein the first, second, and third polishing compositions have a removal rate ratio of first dielectric material to second dielectric material of about 30:1 or greater.

PATENT

Attorney Docket No.: AMAT/7985/CMP/CMP/RKK
Express Mail No.: EV335471122US

20. The method of claim 16, further comprising conditioning the first fixed-abrasive polishing article prior to polishing.
21. The method of claim 16, further comprising conditioning the first fixed-abrasive polishing article during polishing.
22. The method of claim 16, wherein the first, second, or third polishing compositions further contain abrasive particles.
23. The method of claim 16, further comprising altering the surface of the first, second, or third fixed-abrasive polishing articles with a non-mechanical technique selected from the group of applying heat to the polishing article, chemical etching the polishing article, or combinations thereof.
24. A method for processing a substrate, comprising:
 - providing a substrate comprising a first dielectric material disposed on a second dielectric material, wherein the surface of the first dielectric material has a non-planar topography;
 - polishing the substrate with a first polishing composition and an abrasive-free polishing article to remove at least the topography of the first dielectric material;
 - polishing the substrate with a second polishing composition and a first fixed-abrasive polishing article until bulk first dielectric material is substantially removed; and
 - polishing the substrate with a third polishing composition and a second fixed-abrasive polishing article to remove residual first dielectric material formed thereon.